

AMENDMENT

Serial Number: 10/585,680

Filing Date: July 10, 2006

Title: METHOD AND APPARATUS FOR PARTITIONING PROGRAMS TO BALANCE MEMORY LATENCY

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IN THE CLAIMS

Please amend the claims as follows.

1. (Currently Amended) A method of compiling code, comprising:
partitioning instructions in the code among a plurality of processors based on memory access latency associated with the instructions by partitioning memory access dependence chains.

2. (Canceled)

3. (Original) The method of Claim 1, wherein partitioning instructions comprises partitioning a memory access dependence chain into an upstream stage.

4. (Currently Amended) The method of Claim 1, wherein partitioning instructions comprises partitioning a memory access dependence chain into an upstream stage by assigning a first number of desired upstream nodes to the upstream stage, and assigning instructions in the code ~~for on~~ which the first number of desired upstream nodes are dependent ~~on~~ to the upstream stage.

5. (Original) The method of Claim 4, wherein the number of desired upstream nodes is the length of the memory access dependence chain divided by a pipelining degree.

6. (Currently Amended) The method of Claim 4, further comprising:
generating a new number of desired upstream nodes if a computed weight of the upstream stage exceeds a predetermined value; and
assigning a first new number of desired upstream nodes to the upstream stage; and
assigning instructions in the code ~~for on~~ which the first new number of desired upstream nodes are dependent ~~on~~ to the upstream stage.

7. (Original) The method of Claim 3, further comprising partitioning the memory access dependence chain into a downstream stage.

8. (Currently Amended) The method of Claim 7, wherein partitioning the memory access dependence chain into the downstream stage comprises:

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assigning a last number of desired downstream nodes to the downstream stage; and
assigning instructions in the code which are dependent on the ~~first~~last number of desired downstream nodes to the downstream stage.

9. (Original) The method of Claim 8, wherein the number of desired downstream nodes is $N*(d-1)/d$, where N is a length of the memory access dependence chain, and d is a pipelining degree.

10. (Original) The method of Claim 1, further comprising identifying instruction dependence information.

11. (Original) The method of Claim 1, further comprising constructing a memory access dependence graph.

12. (Original) The method of Claim 1, further comprising:
constructing a memory access dependence graph; and
identifying a memory access dependence chain from the memory access dependence graph.

13. (Currently Amended) An article of manufacture comprising a non-transitory machine accessible medium including sequences of instructions, the sequences of instructions including instructions which when executed cause the machine to perform:

partitioning instructions in code into a plurality of pipeline stages to be executed in parallel by~~among~~ a plurality of processors based on memory access latency associated with the instructions.

14. (Currently Amended) The article of manufacture of Claim 13, further comprising instructions which when executed causes the machine to further perform constructing a memory access dependence graph.

15. (Currently Amended) The article of manufacture of Claim 13, wherein partitioning instructions comprises partitioning a memory access dependence chain into an upstream stream by assigning a first number of desired upstream nodes to the upstream stage, and assigning

instructions in the code ~~for~~on which the first number of desired upstream nodes are dependent ~~on~~ to the upstream stage.

16. (Currently Amended) A code ~~partitioning~~analysis unit implemented on a processor, comprising:

a dependence information unit to identify dependencies between instructions in code; and
a code partitioning unit to partition instructions in the code into a plurality of pipeline stages to be executed by~~among~~ a plurality of processors based on memory access latency associated with the instructions.

17. (Currently Amended) The apparatus of Claim 16, wherein the code partition unit comprises:

a length unit to determine a number of ~~desired lengths of upstream nodes from a memory access dependence chain~~ to assign to an upstream stage;
an assignment unit to assign a first number of desired ~~lengths of upstream~~ nodes to the upstream stage;
a close up unit to assign instructions in the code for which the first number of desired length of upstream nodes are dependent ~~on~~ to the upstream stage; and
an evaluation unit to determine whether a computed weight of the upstream stage exceeds a predetermined value.

18. (Currently amended) The apparatus of Claim ~~17~~16, wherein the length unit determines a new number of desired length of upstream nodes in response to the evaluation unit determining that the computed weight of the upstream stage exceeds the predetermined value.

19. (Currently Amended) The apparatus of Claim 16, wherein the length unit determines a number of ~~desired length of downstream nodes from the memory access dependence chain~~ to assign to a downstream stage, the assignment unit assigns a first number of desired ~~length of downstream~~ nodes to the downstream stage, the close up unit assigns instructions in the code ~~for~~on which are dependent on the first number of desired length of down stream nodes, and an evaluation unit to determine whether a computed weight of the downstream stage exceeds the predetermined value.

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20. (Currently Amended) The apparatus of Claim 19, further comprising a balancing unit to assign remaining instructions to the upstream stage and the downstream stage in a manner that substantially balances computed weight.